



**NOAA Teacher at Sea  
Leann Manley  
Onboard NOAA Ship  
DELAWARE II  
March 23 – 31, 2005**

**Daily Logs:**

Day 1: Good Friday, March 24, 2005

Latitude: 40° N

Longitude: 72° W

SOG (speed over ground - boat): 10.8 knots

Speed log (speed of boat through water): 10.2 knots

COG (course over ground - boat): 241°

Furuno3 (3 meters deep) temp.: 2.4° C

Air temp.: 3.7° C

TSG (thermosalinograph) conductivity: 29

TSG Salinity: 31.4 ppt. (3.1%)

Fluorescence value (phytoplankton): 253 µg/L

Swells: 2- 3 feet (varies)

This is my first shift. I've been told that most boats work a 6 hour on and 6 hour off shift cycle. This particular cruise, on board the 147' Delaware II, we are pulling 12 hour shift cycles. I awoke at 0500 hours (10 Greenwich Standard time), gathered my gear, ate breakfast and then started interviewing crew members.

Last night (or early this morning) while I was off duty the night crew calibrated the Simrad 500 (echosounder – fish finder sonar). This sonar device is the standard device used by NOAA to do fish population counts. The basic objective of this cruise is to do acoustical fish surveys off the New Jersey continental shelf. We will transect the area of study going from shallow to deeper areas of the shelf.

Mike Jech is the chief scientist. He explained the meaning for the abbreviations on the data display screen. The probes that acquire this data are located on the hull of the Delaware II. They record a vast array of quantitative measurements. I included the ones in my log that apply to this cruise.

Eventually, we will deploy a CTD (conductivity, temperature and depth) sensor at the beginning and at the end of every transect. The abiotic datum it will provide is very important in order to accurately survey the fish.

Rob Gamble, contracting scientist with Mike, assists in handling the technology involved with the fish survey. He helps setup and run the Simrad equipment and the limnoterra, which is a magnetic fish measuring board. He also assists in the use of the FSCS (a computer program used to enter the fish survey data).

Dan Price is the acting executive officer on this cruise. He explained the transects that we will be doing off the coast of Southern New Jersey. An area of land off the coast was chosen to do population counts of Atlantic Mackerel and Herring. The transects are basically the ship's course "transecting" the chosen area of study. Picture a large square with lines crossing back and forth (in a lawn mower pattern) across the square. We will transect the chosen square/area about 8 times. Within this survey area, the fish finding sonar will be used to locate areas of schooling, or fish hot spots. Trawls and underwater video will be used to identify the fish found by the sonar.

Pete Langlois, acting chief Boatswain, is in charge of many things. One of his main areas of operation is handling and directing the releasing and retrieving of the trawling net. At 8:30am they (Mike, Pete, and Dan) released the trawl for a practice run. We will be at the area of study about 2 pm. At that time we will start the first transect. Mike Jech just stated that we have a leak in a hydraulic seal—the hydraulic system operates the trawl (among many other systems on this boat). The pictures I took show the net in the water, the leak was apparent when they started to retrieve the net. Most likely we have to enter a port to get the parts needed to repair the leak. For now, the Simrad will be used.

Personal log:

So far today has consisted of interviewing, writing log entries, taking Dramamine and staying hydrated.

They have an exercise bike on this ship and it's a nice reprieve for me!

Since my students are on spring break, most are not available for e mail communication. I will show them my pictures when I return and highlight the objectives and methodology of this cruise.

On only the first day I've learned a great deal about the equipment and methods used on this cruise.

Day 2: Saturday, March 26, 2005

Latitude: 39° N

Longitude: 73° W

SOG (speed over ground - boat): 10.2 knots

Speed log (speed of boat through water): 9.9 knots

COG (course over ground - boat): 90°

Furuno3 (3 meters deep) temp.: 3.8° C

Air temp.: 4.4° C

TSG (thermosalinograph) conductivity: 30.8

TSG Salinity: 32.1 ppt. (3.2%)

Fluorescence value (phytoplankton): 254.1 µg/L

Swells: 2 feet

Yesterday's shift ended by releasing and retrieving the first CTD (conductivity, Temp and depth) probe. We hit the area of study (diagram after this log) and are starting the transects. It takes about a 4 hour steam to complete each transect. At the start of each transect the CTD probe is released to take its abiotic measurements (as stated in its name). This information is important to understand what conditions the fish thrive in and also to note any density-dependent or independent limiting factors.

This survey is near the Southern coast of New Jersey and about 10 – 15 miles off the coastline. Mike Jech stated that we are a bit too shallow. We will most likely move the transects slightly east to hit deeper waters. The last CTD probe hit a depth of only 11 meters on the west side of the transect (near the coastline).

After our first CTD probe readings last night Mike took Deanelle "D", Mike (volunteer) and I up to the computer room in the bridge to decipher some of the acoustic readings that the Simrad collected. I didn't realize how difficult it was to interpret the readings. The acoustic readings are taken with 3 different wavelengths: 18 kHz, 38kHz and 128 kHz. Due to the different frequencies of these wavelengths different colors are assigned to each level of kHz. The difficulty lies when they overlap. Also, since a species-specific fish-finder is only a hope for the future, it is hard to interpret from the data what types of fishes are being detected.

"D" is a PhD student studying mechanical engineering at MIT. She specializes in long-range acoustics, so she was asked to join Mike J's crew to learn and help out with this survey. She is one who is hopeful to design a long-range species-specific fish finder.

The early morning seems best to write log entries; so, the first quarter of my shift is the standard time for these entries. Shortly, we will release the CTD again and also take a water sample at that depth. The water sample is collected using a 4" PVC tube with spring inserts attached to the ends, or doors of the tube. Before the tube is released the spring loaded "doors" are tied open. Once the tube is at the desired depth the spring loaded "doors", which are attached to a cord that someone has onboard the ship, are pulled releasing the springs and closes the doors. Upon return to the surface, the water is bottled and given to the National Marine Fisheries upon return to port for testing.

The  
Coastline  
Of  
Southern  
New  
Jersey

-

-

-

-

-

West \_\_\_\_\_

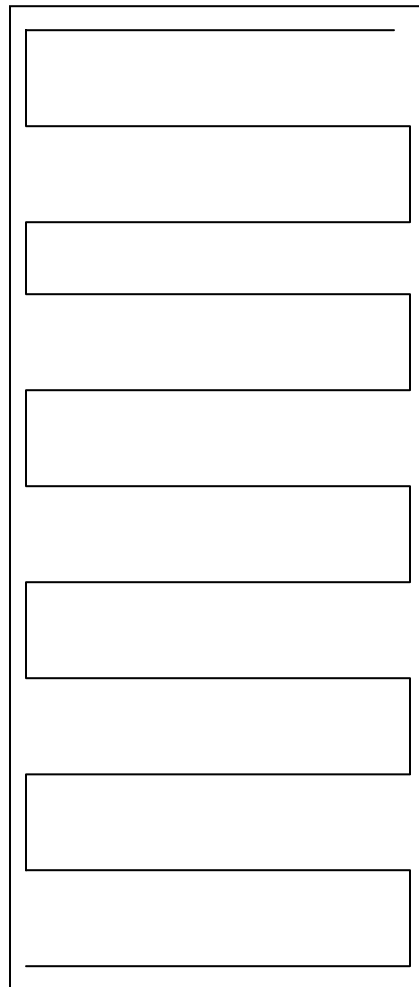
- 10 – 15 miles

-

-

-

-



The rectangular box represents the area of survey/study. The lines transecting the rectangle, creating a serpentine, is the course of the Delaware II. The CTD probe is released at the beginning of each transect, or line. The trawl, if the hydraulics were working, would have been released when the Simrad detected fish along this transect.

Personal log:

It is nice not to have e mail bombarding me every minute – The exercise bike is still a favorite...but the dehydration due to the Dramamine cramps muscles—I like discussing past, present and future research projects with the crew. The cold is a nice change. I’ve written 13 ideas for lessons applicable to this research...now I just have to write the procedures for each. Last, but not least, Snood is a cool game.

Day 3: Easter Sunday, March 27, 2005

Latitude: 38° N

Longitude: 73° W

SOG (speed over ground - boat): 9.9 knots

Speed log (speed of boat through water): 9.5 knots

COG (course over ground - boat): 178°

Furuno3 (3 meters deep) temp.: 4.3° C

Air temp.: 6.1° C

TSG (thermosalinograph) conductivity: 30.8

TSG Salinity: 32.5 ppt. (3.2%)

Fluorescence value (phytoplankton): 248.9 µg/L

Swells: 2 feet (very calm)

For a good portion of yesterday afternoon I took pictures and recorded them on the lap top. My confidence level isn't high as I've never used a digital camera before; every time I take a picture I worry it won't be there when I need it back home.

After the picture taking session, Mike J had the patience to teach me how to clean up the data from the Simrad 500. The amount of work it takes to work through the "noise" to get to the real data (the fish) is tedious and time consuming. I'm really starting to appreciate scientists in the field; patience and perseverance is definitely a needed characteristic for the research scientist profession.

We're about half way through the transects at this time. We will probably start steaming back towards Woods Hole this evening—which will take a good 15 hours. The hydraulic winch will be serviced at that time; if all goes well and the weather looks decent then the boat will go back out on Tuesday.

The internet is down in Norfolk —where the server is located—it feels strange to be this out of touch with people. I can send the e mail messages, but they are only put in a queue until the server is back online. I started to send the log entries via attachment and I'm still wondering if they went through.

This morning we collected the 12<sup>th</sup> session of data of the CTD—nothing out of the ordinary. So far we've taken 2 water samples; the night shift took the 2<sup>nd</sup> one last night. And we have another hour to go until the next CTD collection.

While working with Mike J yesterday it was difficult for me to discern between data "noise" and real data (the fish). The data "noise" consists of bubbles, other ship's wakes and other sonar equipment on this ship. Mike discovered the interrupting sonar and had them turned off.

He and a few others in the bridge computer room can discern between a larger fish (a bunch of gray and white blocks to me) and a school of smaller fish. The other area that is difficult to discern is the changing topography of the ocean floor data and fish data. Since we aren't surveying in deep waters many fish stay close to the bottom. One way to

gain confidence in knowing whether the data is fish or noise is by comparing one kHz level with another. If the data is consistent at all three levels then the confidence level is high that the data isn't just noise.

I met one of the engineers last night, Grady Abney . He was working out in our “inside gym” and I was in line to use the “inside gym”, so we talked for a while. Later today I might get a chance to visit the engine room. The reliability of these ships drive trains is phenomenal. The engines run constantly—24/7 and I couldn't find one person on board that had a NOAA ship leave them stranded. Crew members recalled equipment needed to carry out a research trip breaking (like the hydraulics on this trip), but never an engine.

Personal log:

The way these professionals work together in close quarters is something to see. From what I notice there is no hierarchy that is necessary to enforce. Everyone has a demanding job to perform and knows the significance of that position. They also know that no cruise would be successful if one group of crew members (engineers, operations officers, galley crew, fishermen, scientists) didn't perform to task. They say the close quarters starts to wear at everyone on the longer cruises, but they develop methods to keep pettiness at bay.

I miss land—running, going for walks, roller blading, etc.

The “inside gym”, which consists of an exercise bike, is my only recourse.

Day 4: Monday, March 28, 2005

Latitude: 41°N

Longitude: 70° W

SOG (speed over ground - boat): 10.5 Knots

Speed log (speed of boat through water): 10.4 knots

COG (course over ground - boat): 34°

Furuno3 (3 meters deep) temp.: 2.1° C

Air temp.: 3.8° C

TSG (thermosalinograph) conductivity: 28

TSG Salinity: 31 ppt. (3.1%)

Fluorescence value (phytoplankton): 244.7 µg/L

Swells: 2 feet (very calm)

Yesterday afternoon included a variety of happenings. First, I interviewed some more crew members, took some more pictures, ran the CTD probe and water sampler 2 times, helped clean up data noise from the simrad, and finished up taking a tour of the engine room.

I spoke with Lisa again, as she was up during my shift to clean up some datum for her research. She is doing a paper on topographical features and the species of fishes which thrive in each type. Different types of flora and fauna, rock bottom, or murky detritus bottom, and also the step sloped type bottom. I just reread that sentence and it's funny. Anyway, Lisa is a contracted scientist who works with Mike J.

Bill (a.k.a. the ultimate Snood player, Kill Bill) spoke with me a while about NOAA careers and what he's gained by working for them. He ultimately was hired as an undergrad, then over the years NOAA paid for him to go through a PhD program, I think at U.Mass. Note to self: Now isn't that strange, the federal government pay for scientists to better their education, but state governments won't for educators to better their education. He's worked with Mike J for about 5 years now on the fish surveys. His specialty is the underwater camera/video equipment and he showed me a few models they brought with them. Ultimately, we were going to put them in today, but since we have to head back to Woods Hole to get the hydraulics fixed, we'll wait until we back out Tuesday.

Grady Abney is one of the engineers on board. He is a retired civilian, and has worked on this ship for 8 years now. He showed me around the engine room and patiently answered my many questions. How this ship runs is amazing. Or maybe more amazing is that the basic internal combustion engine that we purchase to get from point A to point B barely lasts 100,000 miles – not running constantly. This 12 cylinder Diesel engine onboard the Delaware II was installed in 1968 and runs, basically nonstop. They have a rebuild kit (piston sleeves bearings and gaskets) onboard. It's refitted/overhauled after so many hours...no other real maintenance, other than oil changes, is performed. This monster has 1025 horsepower and runs through approximately 1100 gallons of fuel a day on a good day—at a normal 10 knot pace. The tachometer hovers around 800 rpm and the reducer, better known to us as a transmission, takes the power from the rpm's and runs

the propeller, reducing the rpm's to 250. The temperatures are rather intense...even when it's freezing outside that room stays at a nice 95 degrees F with the vents open. The engine case temp is about 450 degree F, and the oil temp is 160 degrees F. The camshaft has never been replaced...37 years old. Grady showed me the generators and their backup. The other feature in the engine room that is interesting is the evaporator (i.e., the desalinator) . Get this, the fresh water that is sealed in the engine serving as the radiator, is run through an area of incoming sea water. The heat from water which cooled the engine is used to evaporate the sea water. The only other process the newly made drinking water goes through is a bromine filter; at that point the water is safe to drink.

We took the last 2 CTD reading yesterday and the 3<sup>rd</sup> water sample. The CTD worked great until a short occurred (thankfully on the last release) the CTD read accurately to 375 meters and then just stopped all data retrieval. The area we were over at the time was 550 meters deep.

Mike J called me out to the aft of the ship to point out dolphins and D said she saw a couple of whales. Dolphins don't really thrive in the colder regions in the winter. When I was cleaning up data with Mike, it revealed a mass of fish in 6 places on the readout. One mass of fish was about 1.5 miles long. But since we can't trawl I have a hard time visualizing the little blocks on the screen to real fish.

We're about 2 – 3 hours from Woods Hole right now.

Personal log:

Dennis and Nellie put on a phenomenal Easter Dinner; they're both awesome cooks.

I'm tired of the shower beating me up.

I've never had an exercise bike move around the room when I rode it.

Walking into walls has become a favorite activity of mine.

My powerpoint, picture not text, slide show is up to 50 right now.

I'm going to buy a diesel vehicle when I get home.

I will definitely write another grant to attain more computer based lab equipment and develop at least 4 core labs that I do with them each year. Computer based lab equipment is a great way to teach the students data analysis (statistical error).